Canadian Centre for Occupational Health and Safety

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RAYNAUD'S PHENOMENON (WHITE FINGER)

A Summary of the Occupational Health Concern

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RAYNAUD'S PHENOMENON (WHITE FINGER)--A SUMMARY OF THE OCCUPATIONAL HEALTH CONCERN

This publication was prepared as a source of information for health and safety committees and others with an interest in understanding and reducing the occupational risk of Raynaud's phenomenon.

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TABLE OF CONTENTS

1.	INTRODUCTION	1
2.	WHAT IS RAYNAUD'S PHENOMENON?	1
3.	WHAT CAUSES RAYNAUD'S PHENOMENON?	1
4.	WHAT WORKERS ARE AT RISK OF RAYNAUD'S PHENOMENON?	2
5.	HOW COMMON IS RAYNAUD'S PHENOMENON?	2
6.	WHAT ARE THE SIGNS AND SYMPTOMS OF RAYNAUD'S PHENOMENON?	3
7.	HOW LONG DOES IT TAKE FOR RAYNAUD'S PHENOMENON TO DEVELOP?	4
8.	WHAT TESTS ARE AVAILABLE FOR RAYNAUD'S PHENOMENON?	4
9.	WHAT TREATMENT IS AVAILABLE FOR RAYNAUD'S PHENOMENON?	4
10.	HOW CAN RAYNAUD'S PHENOMENON BE PREVENTED?	4
	General Precautions	5
	Precautions with Vibrating Tools	5
11.	HOW DO YOU COPE WITH RAYNAUD'S PHENOMENON?	5
12.	CONCLUSION	6
	FURTHER READING	7

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1. INTRODUCTION

Raynaud's phenomenon is a disorder of blood circulation in the fingers. It affects the finger's response to cold, causing attacks of "white finger" by drastically reducing the flow of blood. Mild cases sometimes affect a person's social life and work activities. Advanced cases can cause disability.

Raynaud's phenomenon has many different causes, some related to the workplace. It is most commonly associated with hand-arm vibration syndrome, but it is also involved in other occupational diseases. It is important to know the signs and symptoms of Raynaud's phenomenon and the workplace hazards that cause it. Awareness can help prevent the disorder from occurring or progressing to a serious stage.

2. WHAT IS RAYNAUD'S PHENOMENON?

Raynaud's phenomenon, sometimes called Raynaud's syndrome, is a disorder that causes the fingers to overreact to cold. Exposure to cold abnormally reduces blood circulation, causing the fingers to become pale, waxy-white or purple. The disorder is sometimes called "white finger," "wax finger" or "dead finger."

Although Raynaud's phenomenon is not life threatening, severe cases cause disability, forcing workers to leave their jobs. Workers less severely affected sometimes have to change their social activities and work habits to avoid attacks of white finger. Although rare, severe cases can lead to breakdown of the skin and gangrene.

Why Raynaud's phenomenon occurs is not well understood. Usually, the body conserves heat by reducing blood circulation to the extremities, particularly the hands and feet. This response uses a complex system of nerves and muscles to control blood flow through the smallest blood vessels in the skin. In people with Raynaud's phenomenon, this control system becomes too sensitive to cold, and greatly reduces blood flow in the fingers. Damage to either the muscles or nerves that control blood flow may cause Raynaud's phenomenon.

3. WHAT CAUSES RAYNAUD'S PHENOMENON?

Some people have Raynaud's phenomenon for reasons that cannot be determined. This is called "primary Raynaud's phenomenon," "Raynaud's disease" or "constitutional white finger." It usually affects both hands equally, and attacks of white finger occur in response to stress as well as cold. It usually affects other family members as well.

People can also get Raynaud's phenomenon because of certain diseases or injuries. This form is known as "secondary Raynaud's phenomenon." Within the workplace, several hazards can cause Raynaud's phenomenon.

Exposure to vibration from power tools is by far the greatest concern. Hand-held power tools such as chain saws, jackhammers and pneumatic rock drillers and chippers can cause "hand-arm vibration syndrome." This disorder is also known as "vibration-induced white finger" or "Raynaud's phenomenon of occupational origin." Raynaud's phenomenon, however, is only one aspect of the hand-arm vibration syndrome. Vibration also damages nerves, muscles, bones and joints of the hand and arm. For more information on this, refer to the CCOHS publication, Health Hazards of Exposure to Vibration.

In the years before its hazardous properties were understood, exposure to high levels of vinyl chloride caused Raynaud's phenomenon. It also caused breakdown of the bones of the fingertips, and other health problems. Raynaud's phenomenon from vinyl chloride is now an unlikely occurrence in Canada since exposure to this chemical is controlled much better than in the past.

Frostbite injury with damage to the blood vessels can also cause Raynaud's phenomenon. A single study reports that fish plant workers developed Raynaud's phenomenon after continually chilling and rewarming their hands several times a day over a period of years.

Several years ago, isolated studies suggested that gripping a hand tool too tightly could cause Raynaud's phenomenon. Other isolated studies have identified Raynaud's phenomenon in workers who injured their hands by using them for hammering, or pushing or twisting heavy objects. In these cases, Raynaud's phenomenon was part of a disorder called hypothenar hammer syndrome.

4. WHAT WORKERS ARE AT RISK OF RAYNAUD'S PHENOMENON?

Raynaud's phenomenon is primarily a concern for workers who handle vibrating tools or equipment such as pneumatic drills, jackhammers, chipping hammers, riveting tools, impact wrenches, pavement-breakers, gasoline-powered chain saws, electric tools and grinding wheels, especially in pedestal grinders. Raynaud's phenomenon from other causes are relatively rare.

5. HOW COMMON IS RAYNAUD'S PHENOMENON?

Studies show that Raynaud's phenomenon commonly occurs in workers in certain occupations that involve exposure to vibration. For example, 50 percent of 146 tree fellers examined in British Columbia had Raynaud's phenomenon; it affected 75 percent of workers with over 20 years of experience.

Another study showed that 45 percent of 58 rock drillers had attacks of white finger; 25 percent of workers with less than five years of experience, but 80 percent of those with over 16 years experience were affected.

6. WHAT ARE THE SIGNS AND SYMPTOMS OF RAYNAUD'S PHENOMENON?

Attacks of poor blood circulation in the fingers are the most noticeable symptom of Raynaud's phenomenon. These attacks occur when the hands or the whole body get cold either at work or at home. They can be brought on by household or leisure activities such as washing a car, holding a cold steering wheel of a car, or the cold handlebars of a bicycle. Attacks of white finger can happen when a person is outdoors watching sports, or while gardening, fishing or golfing in cold weather.

Typical attacks occur with:

- tingling and slight loss of feeling or numbness in the fingers,
- blanching or whitening of the fingers, usually without affecting the thumb, and
- pain, sometimes with redness, which accompanies the return of blood circulation generally after 30 minutes to two hours.

Occupationally induced Raynaud's phenomenon gradually gets worse if workers remain exposed to the condition that cause the problem. As the disorder gets worse, the attacks become stronger and more frequent. So it is extremely important to recognize the signs and symptoms in the early stages.

The Taylor-Pelmear scale system, updated at the 1986 Stockholm Workshop, classifies vibration-induced Raynaud's phenomenon into four stages.

Table - Taylor-Pelmear scale system

Stage	Grade	Description
0	--	No attacks
1	Mild	Occasional attacks affecting the tips of one or more fingers
2	Moderate	Occasional attacks affecting the tips and middle sections of the fingers (rarely the base of the fingers) on one or more fingers
3	Severe	Frequent attacks affecting the entire length of most fingers
4	Very severe	As in stage 3, with damaged skin and possible gangrene in the finger tips

7. HOW LONG DOES IT TAKE FOR RAYNAUD'S PHENOMENON TO DEVELOP?

The time between first contact with the hazardous condition and the appearance of Raynaud's phenomenon is known as the latent period. This varies according to the type of hazard, the amount of exposure and the individual worker. Some people are more susceptible than others.

The latent period for vibration exposure can be as short as one year. As a general rule, severe exposure reduces the latent period. If the latent period for a group of workers is short, the disorder tends to appear more frequently. Also, in individuals with a short latent period, Raynaud's phenomenon tends to progress to advanced stages faster.

8. WHAT TESTS ARE AVAILABLE FOR RAYNAUD'S PHENOMENON?

Several laboratory tests can help determine if a person has Raynaud's phenomenon. Some of these tests measure skin sensitivity or blood flow in the fingers, especially under cooling conditions. As yet, however, none of these tests is universally accepted for detecting Raynaud's phenomenon. Together with careful analysis of an individual's work history and medical history, they are useful in judging if a person has Raynaud's phenomenon.

9. WHAT TREATMENT IS AVAILABLE FOR RAYNAUD'S PHENOMENON?

Workers with mild cases of vibration-induced Raynaud's phenomenon may recover if the hazard that causes it is avoided. For severe cases, prescribed drugs may reduce the attacks of white finger. The most effective therapy, however, is to avoid further exposure to vibration. Extra clothing to maintain a high body temperature as well as gloves to keep the hands warm are essential.

If caught in the early stages, vibration-induced Raynaud's phenomenon will not worsen as long as there is no further exposure to vibration. Early cases may actually improve, but advanced cases seldom do.

Surgery often reverses Raynaud's phenomenon caused by hypothenar hammer syndrome.

10. HOW CAN RAYNAUD'S PHENOMENON BE PREVENTED?

Joint occupational health and safety committees should be aware of workplace hazards that cause Raynaud's phenomenon, and the precautions to prevent exposure.

General Precautions

- Protect the hands from damage and extreme temperatures.
- If tingling, numbness or signs of white finger develop, promptly consult a physician.

Precautions with Vibrating Tools

Although significant advances have been made in reducing tool vibration, preventative measures to reduce this hazard are still necessary. At present, there are no official standards for vibration exposure in Canada. Various agencies and other countries, however, have proposed guidelines. For more information, refer to CCOHS publication Health Hazards of Exposure to Vibration.

In general, grinding, machining, and vibrating processes should be as fully automated as possible. Workers should use vibrating tools only when necessary.

There are several ways to reduce the amount of vibration that passes from the tool to the hands.

- Use only well-maintained and properly operating tools.
- Hold vibrating tools as lightly as possible, consistent with safe work practices. Let the tool do the work.
- Rest vibrating tools on a support or work piece as much as possible.
- Use proper job design with scheduled breaks to reduce exposure to vibration.

Anti-vibration tools, anti-vibration gloves, and anti-vibration shields are recent developments that may also help reduce exposure to vibration.

It is important for workers to recognize if early symptoms of Raynaud's phenomenon have occurred, and then get appropriate advice to reduce further exposure to vibration.

11. HOW DO YOU COPE WITH RAYNAUD'S PHENOMENON?

Precautions can be taken to reduce the number and intensity of attacks of white finger. These precautions include the following:

- Protect the body from cold temperatures.
- Avoid immersing unprotected hands in cold water.
- Protect the hand from injury.

- Avoid tobacco since nicotine sometimes causes poor blood circulation in the fingers.
- Dress completely for cold weather by wearing gloves, overcoat, hat and scarf.

12. CONCLUSION

Raynaud's phenomenon is an occupational disease that affects a wide variety of workers. If not caught in the early stages, the disorder can progress to the point where it permanently impairs blood circulation in the fingers. It is important to know the signs and symptoms of the disorder, and the workplace hazards that cause it. Through proper precautions, Raynaud's phenomenon can be prevented from occurring or progressing to advanced stages.

For more information, consult the section "Further Reading" of this document, or contact the Inquiries Office of the Canadian Centre for Occupational Health and Safety.

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